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10/808,726	03/24/2004	Charles William Rowe	44928.000021	5621

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EXAMINER	
SHOSHO, CALLIE E	
ART UNIT	**PAPER NUMBER**
1714	

DATE MAILED: 12/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/808,726	ROWE ET AL.	
	Examiner	Art Unit	
	Callie E. Shosho	1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *59-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *59-66,72-77 and 80-82* is/are rejected.

7)☒ Claim(s) *67-71,78 and 79* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 September 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/19/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. It is noted that the Restriction requirement set forth in the office action mailed 7/19/06 has been withdrawn in view of applicants' cancellation of claims 1-58 in the amendment filed 9/19/06.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "200" and "250" (see page 14, lines 4 and 26).

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "200" has been used to designate both powder and binder liquid (see page 14, lines 23-24).

4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 72-74, 80, and 82 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) Claim 72 recites "exposing the article to a flow of gas which is substantially free of the vapor of the liquid composition". The scope of the claim is confusing given that it is not clear what is meant by "substantially free". How much vapor of the liquid composition can the gas contain and still be considered "substantially free"? Clarification is requested.

(b) Claim 80 recites "further comprising exposing the article to water or an alcohol or another organic solvent". The scope of the claim is confusing given that it is not clear how or when the article is further exposed to water, an alcohol, or another organic solvent. Is the water, alcohol, or another organic solvent part of the liquid composition or is the article exposed to the water, alcohol, or another organic solvent separately from the liquid composition? Clarification is requested.

(c) Claim 82 recites "the article contains substantially no halogenated hydrocarbon solvent or co-solvent or conductivity enhancing substance? The scope of the claim is confusing given that it is not clear what is meant by "substantially". How much halogenated hydrocarbon solvent or co-solvent or conductivity enhancing substance can the article contain and still be

considered to contain "substantially" no halogenated hydrocarbon solvent or co-solvent or conductivity enhancing substance? Clarification is requested.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 59-63, 65, 75-76, and 80-82 are rejected under 35 U.S.C. 102(e) as being anticipated by Sherwood et al. '936 (U.S. 2003/0114936) taken in view of the evidence given in Uehara et al. (U.S. 4,368,476).

Sherwood et al. '936 disclose method for three dimensional printing an article comprising dispensing through a continuous inkjet printhead or drop-on-demand printhead a liquid composition comprising halogenated hydrocarbon solvent, i.e. chloroform, co-solvent miscible with the halogenated hydrocarbon solvent, i.e. ethanol or acetone, and polylactic-co-glycolic acid which is identical to the conductivity enhancing substance of the present invention. The method further comprises, after dispensing the liquid composition, heating the article to accelerate evaporation of liquid after deposition of a layer has been complete. There is also disclosed a method wherein, after dispensing the liquid composition, chloroform is removed using liquid

CO_2. There is further disclosed an article manufactured by the above method (paragraphs 19, 34-36, 49, 80-81, 84, 106-107, 110, 117, and 201). Although there is no explicit disclosure that the printhead comprises means for imparting electric charge to droplets of the liquid or is a deflection printhead, it is well known, as evidenced by Uehara et al. (col.1, lines 37-50), that continuous ink jet printing inherently comprises charging droplets and deflection electrodes.

In light of the above, it is clear that Sherwood et al. '936 anticipate the present claims.

9. Claims 59 and 81 are rejected under 35 U.S.C. 102(b) as being anticipated by Cima et al. (U.S. 5,518,680).

Cima et al. disclose method for three dimensional printing an article comprising dispensing through ink jet printer a binder or liquid composition comprising halogenated hydrocarbon solvent, i.e. chloroform, co-solvent miscible with the halogenated hydrocarbon solvent, i.e. ethyl acetate, and polylactic acid which is similar to the conductivity enhancing substance of the present invention. There is further disclosed an article manufactured by the above method (col.3, lines 39-41, col.4, lines 7-8, col.7, lines 63-67, and col.8, lines 35-40). Although there is no explicit disclosure that the liquid composition is dispensed through a printhead, given that a printhead is an inherent feature of an ink jet printer, it is clear that when dispensed through ink jet printer, the composition is inherently dispensed through a printhead.

In light of the above, it is clear that Cima et al. anticipate the present claims.

10. Claims 59, 62, and 80-82 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoffmann et al. (U.S. 4,106,027).

Hoffmann et al. disclose method of printing an article comprising dispensing though ink jet printer a liquid composition comprising halogenated hydrocarbon solvent, i.e. chloroform, co-solvent miscible with the halogenated hydrocarbon solvent, i.e. ethanol, and conductivity enhancing agent identical to the conductivity enhancing substance of the present invention, i.e. ammonium acetate (col.1, lines 4-8, col.2, lines 48-62, col.4, lines 14-16, 19-20, 23, and 49-54). Although there is no explicit disclosure that the liquid composition is dispensed through printhead, given that a printhead is an inherent feature of an ink jet printer, it is clear that when dispensed through ink jet printer, the liquid composition is inherently dispensed through a printhead. Further, given that Hoffmann et al. disclose that the solvent evaporates quickly and given that Hoffmann et al. disclose solvent, i.e. chloroform and ethanol, identical to that presently claimed, it is clear that the produced article would inherently contain substantially no chloroform or ethanol.

While there is no disclosure that the method is "for three dimensional printing an article" as presently claimed, applicants attention is drawn to MPEP 2111.02 which states that "if the body of a claim fully and intrinsically sets forth all the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction". Further, MPEP 2111.02 states that statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the purpose or intended use results in a structural difference between the claimed invention and the prior art. Only if such structural

difference exists, does the recitation serve to limit the claim. If the prior art structure is capable of performing the intended use, then it meets the claim.

It is the examiner's position that the preamble does not state any distinct definition of any of the claimed invention's limitations and further that the purpose or intended use, i.e. for three dimensional printing, recited in the present claims does not result in a structural difference between the presently claimed invention and the prior art invention and further that the prior art method which is a method identical to that set forth in the present claims is capable of performing the recited purpose or intended use.

In light of the above, it is clear that Hoffmann et al. anticipate the present claims.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cima et al. (U.S. 5,518,680) in view of Sachs et al. (U.S. 5,204,055) and Uehara et al. (U.S. 5,204,055).

The disclosure with respect to Cima et al. in paragraph 9 above is incorporated here by reference.

The difference between Cima et al. and the present claimed invention is the requirement in the claims of specific type of printhead.

Sachs et al., which is drawn to three dimensional printing of an article, disclose that ink jet printing mechanisms utilized in the art include continuous jet stream printhead and drop-on-demand stream printhead wherein continuous jet technology provides higher droplet deposit rates (col.6, lines 10-41). Although there is no explicit disclosure that the continuous printhead comprises means for imparting electric charge to droplets of the liquid or is a deflection printhead, it is well known, as disclosed by Uehara et al. (col.1, lines 37-50), that continuous ink jet printing inherently comprises charging droplets and deflection electrodes.

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to dispense the liquid composition of Cima et al. through continuous printhead or drop-on-demand printhead depending on the droplet deposit rate and printing speed desired, and thereby arrive at the claimed invention.

14. Claims 63-65 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cima et al. (U.S. 5,518,680) in view of Sachs et al. (U.S. 5,204,055).

The disclosure with respect to Cima et al. in paragraph 9 above is incorporated here by reference.

The difference between Cima et al. and the present claimed invention is the requirement in the claims of heating the article to promote evaporation of at least some of the liquid composition.

Sachs et al., which is drawn to three dimensional printing of an article, disclose heating the article to evaporate or remove the binder or liquid composition in order to further enhance binding strength of the article (col.2, line 59-col.3, line 4 and col.5, line 60-col.6, line 9).

Given that Sachs et al. disclose that the binder comprises both liquid and polymer and that the heating operation depends on the particular binder material and on the conditions under which the heating is performed, it would have been within the skill level of, as well as obvious to, one of ordinary skill in the art to choose heating conditions necessary to evaporate solvent and/or conductivity enhancing substance in Cima et al.

In light of the motivation for heating article to evaporate liquid composition disclosed by Sachs et al. as described above, it therefore would have been obvious to one of ordinary skill in

the art to heat the article of Cima et al. in order to remove all or part of the liquid composition in order to enhance binding strength of the article, and thereby arrive at the claimed invention.

15. Claims 63-64, 66, 75, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cima et al. (U.S. 5,518,680) in view of Danforth et al. (U.S. 5,738,817).

The disclosure with respect to Cima et al. in paragraph 9 above is incorporated here by reference.

The difference between Cima et al. and the present claimed invention is the requirement in the claims of exposing the article to heat or supercritical fluid and extraction solvent in order to remove liquid composition.

Danforth et al., which is drawn to fabricating three dimensional articles, disclose removing binder or liquid composition from the article by heating, solvent extraction, supercritical fluid processes, and combinations thereof in order to form final product that has desired dimensions and properties (col.1, lines 12-14, col.2, lines 15-21 and 29-37 and 46-54, and col.13, line 66-col.14, line 4). Although there is no explicit disclosure in Danforth et al. that removing the binder or liquid composition includes evaporation or removal of halogenated hydrocarbon solvent, co-solvent, or conductivity enhancing agent, it would have been within the skill level of, as well as obvious to, one of ordinary skill in the art to choose the parameters for the heating, solvent extraction, or supercritical fluid processes, depending on the components of the binder or liquid composition, that would result in partial or full removal of the components of the binder or liquid composition.

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to remove the liquid composition from the article in Cima et al. by heating, solvent extraction, supercritical fluid processes, and combinations thereof in order to produce final product with desired dimensions and properties, and thereby arrive at the claimed invention.

16. Claims 75-76 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cima et al. (U.S. 5,518,680) in view of Sherwood et al. '811 (U.S. 6,454,811).

The disclosure with respect to Cima et al. in paragraph 9 above is incorporated here by reference.

The difference between Cima et al. and the present claimed invention is the requirement in the claims of exposing the article to a supercritical fluid in order to remove liquid composition.

Sherwood et al. '811, which is drawn to method of three dimensional printing, disclose removing binder or liquid composition from article by using supercritical fluid that is CO_2 in order to reduce shrinkage and improve structural integrity of the article (col.28, lines 57-68 and claim 55).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to remove the liquid composition from the article in Cima et al. by using supercritical fluid that is CO_2 in order to reduce shrinkage and improve structural integrity of the article, and thereby arrive at the claimed invention.

17. Claim 77 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cima et al. (U.S..5,518,680) in view of Danforth et al. (U.S. 5,738,817) and Sherwood et al. '811 (U.S. 6,454,811).

The disclosure with respect to Cima et al. in paragraph 9 above is incorporated here by reference.

The difference between Cima et al. and the present claimed invention is the requirement in the claims of exposing the article to a supercritical fluid and extraction solvent in order to remove liquid composition.

Danforth et al., which is drawn to fabricating three dimensional articles, disclose removing binder from the article by solvent extraction, supercritical fluid processes, and combinations thereof in order to form final product that has desired dimensions and properties (col.1, lines 12-14, col.2, lines 15-21 and 29-37 and 46-54, and col.13, line 66-col.14, line 4).

There is no explicit disclosure in Danforth et al. of specific type of supercritical fluid.

Sherwood et al. '811, which is drawn to method of three dimensional printing, disclose removing binder or liquid composition from article by using supercritical fluid that is CO_2 in order to reduce shrinkage and improve structural integrity of the article (col.28, lines 57-68 and claim 55).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to remove the liquid composition from the article of Cima et al. by using supercritical fluid that is CO_2 and extraction solvent in order to reduce shrinkage and improve structural integrity of the article and to produce final product that has desired dimensions and properties, and thereby arrive at the claimed invention.

Allowable Subject Matter

18. Claims 67-71 and 78-79 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 67-71 and 78-79 would be allowable if rewritten in independent form as described above given that there is no disclosure in the "closest" prior art, namely, Sherwood et al. '936 (U.S. 2003/0114936), Cima et al. (U.S 5,518,680), Hoffmann et al. (U.S. 4,106,027), Sachs et al. (U.S. 5,204,055), Danforth et al. (U.S. 5,738,817) or Sherwood et al. '811 (U.S. 6,454,811) of method of three dimensional printing comprising dispensing through a printhead a liquid composition comprising a halogenated hydrocarbon solvent, co-solvent that is miscible with the halogenated hydrocarbon solvent, and conductivity enhancing agent that is at least soluble in one of the solvents wherein the method further comprises (i) heating the article to a sufficient temperature for a sufficient time to cause decomposition of at least some of the liquid composition, (ii) exposing the article to sub-ambient pressure for a time sufficient to promote evaporation of at least some of the liquid composition, (iii) exposing the article to a supercritical fluid and extraction co-solvent substance that is methanol or acetone or (iv) exposing the article to a supercritical fluid that is nitrous oxide, sulfur hexafluoride, hydrocarbon, or halogenated hydrocarbon having atmospheric boiling point below room temperature.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 571-272-1123. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Callie E. Shosho
Primary Examiner
Art Unit 1714

CS
11/26/06